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tinge is acquired by the membranes of the umbilical vesicles of the porgy on the third day, which is not due to the presence of blood globules.

To whichever of these structural causes, the phenomenon of organic phosphorescence is attributable in this special case, there seems to me to be little doubt that the prime element in the production of phosphorescence in the animal world in general, is some kind of sudden molecular disturbance or impulse, disturbing the equilibrium of the molecules of the living protoplasm involved, so as to produce a kind of motion which makes itself apparent as momentary emissions of light. I have no doubt that the phenomenon in *Lampyris* or the fire-fly, is connected with expiration and inspiration, and possibly in the *Medusæ* with the rhythmical contraction of the umbrella. The application of experimental methods to verify the above suggestions would be very easy.—*J. A. Ryder.*

ZOOLOGICAL NOTES.—Mr. M. M. Hartog shows that the larvæ or zoæ of cancer have, like the adult entomostraca, an anal respiration, the terminal part of the rectum being slightly dilated, and with a rhythmic contraction and expansion associated with the opening and closing of the vent.—Hybrids between males of Reeves's pheasant and hens of the common pheasant were exhibited at a recent meeting of the Zoological Society of London.—A honey ant with an immensely distended abdomen, like *Myrmecocystus*, has been discovered in Australia.—Reinfleisch claims to have demonstrated the origin of the red corpuscles of mammals; *i. e.*, the nucleus of the red-colored cell escapes and atrophies, while the body of the cell contracts and becomes the red corpuscle.—The influence of light on animals has been studied, according to the Journal of the Royal Microscopical Society, by Moleschott and Fubini. It increases the excretion of carbonic acid and the ingestion of oxygen; but this influence is not only effected through the eyes, but by the skin, for it is seen in eyeless animals.—Weismann has found that several ostracode Crustacea, especially *Cypris*, reproduce parthenogenetically.—At the meeting of the Linnæan Society of London, held June 17, Sir John Lubbock presented additional observations on the habits of ants, especially concerning their powers of communicating their ideas to each other; he confirms the prevalent notion that ants possess "something approaching language."

#### ANTHROPOLOGY.<sup>1</sup>

MAYA CHRONOLOGY.—The Proceedings of the American Antiquarian Society, No. 74, contains a paper by Mr. Philipp J. J. Valentini, on the Katunes of Maya history. The Katunes were a series of notable events that transpired from the time of the

<sup>1</sup> Edited by Prof. ORIS T. MASON, Columbian College, Washington, D. C.

departure of the Mayas from their original home until their destruction. Don Juan Pio Perez, a learned Yucatecan, had found an old Maya manuscript containing this account, but failed to discover the author's name. From this precious document Mr. Valentini attempts to reconstruct the Maya chronology in the same manner that he deciphered the Mexican calendar stone. The results at which he arrives are as follows:

1. That the conquerors and settlers of the Yucatecan peninsula, as well as those of the Anahuac lakes, were joint participants in a correction of their national calendar about the year 290 B.C.
2. That about the year 137 A.D., when a total eclipse of the sun took place, the ancestors of both nations set out from their common fatherland, Tula, or Tulapan.
3. That about the year 231 A.D., both nations made their appearance on the coast of Central America, and succeeded in conquering a large portion of the peninsula.

GERMAN ANTHROPOLOGY.—The second number of *Correspondenz-Blatt* der deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte is taken up with a preliminary statement concerning an anthropological and prehistoric exhibition for Germany, which will take place in connection with their Anthropological Society in Berlin, in August of this year. In No. 3 we have an exemplification of what our German cousins accomplish by concentrating one's energies upon a single subject. Dr. H. Fischer, of Freiburg, who is the greatest living authority upon jade, jadeite, nephrite, chloromelanite and kindred material, gives us a detailed account of every specimen of implements made from these materials, and known to exist in public and private museums of Germany, Switzerland and Austria.

Venerable Archdeacon Kirby delivered a lecture before the Philological Society of London, Friday, April 30th, on the Cree language, and the use of the syllabic characters in teaching it to the natives.

Mr. J. B. Good has published at Victoria, British Columbia, a vocabulary and outlines of grammar of the *Nittakapamuk*, or *Thompson tongue*, the language spoken by the Indians between Yale, Lilloet, Cache creek and Nicola lake, to which is added a phonetic Chimok dictionary, adapted for use in the province of British Columbia.

REPORT OF THE PEABODY MUSEUM.—It must be a source of unalloyed pleasure to our older archæologists to look back over the steady progress which a study weighed down at first with wild speculations has made toward becoming an exact science. Among the monuments erected to signalize this improvement and incite to increased activity, the Peabody Museum stands pre-eminent. The twelfth and thirteenth annual reports, constituting Nos. 3 and 4 of Vol. II, are quite up to the mark in the value of their origi-

nal papers. The report of Mr. Putnam, the curator, sums up the labors of Dr. Abbott, Mr. Schumacher, Mr. Gilman, Dr. Earl Flint, Dr. Edward Palmer, Mr. Curtis, Dr. Patrick, and of the immediate force of the institution. The list of contributions is followed by a series of papers, of which a brief sketch is appended.

Mr. Lucien Carr, who has thoroughly qualified himself for the task by studies abroad, gives measurements of 150 crania from California, in which the following characteristics are included: capacity, length, breadth height, index of breadth, index of height, width of frontal, length of face, length of nose, breadth of nose, basi-nasal length, basi-alveolar length, pterion, nasal index, gnathic index, height of orbit, width of orbit, orbital index, zygomatic diameter.

Dr. C. C. Abbot continues his investigations upon the flint chips of New Jersey. Two kinds of workshops have been discovered, one near the natural sources of supply indicates that the Indians came indiscriminately, each to make points for himself; the other, that a few skilled workmen plied their handicraft. The other important discovery of Dr. Abbott is the existence of argillite points belonging to an earlier time than the same implements of flint-like mineral, and forming a connecting link between these latter and those found in the drift gravels of the river valley.

Mr. Paul Schumacher gives us the methods of making pottery and basket ware among the Kahweyachs, on the coast of California. The important points to notice are, the use of an oval dish for the potter's wheel, and the use of the bone needle in stitching basket ware.

The article of Mr. Elmer R. Reynolds on soapstone quarries has been noticed in another connection.

The Hon. Lewis H. Morgan having visited the Pueblos in 1878, studied closely the ruins of a stone structure on the Animas river in New Mexico, and presents his results in an illustrated paper. Mr. Morgan is quick to discern the connection of the environment with the kind and degree of progress which a people have made. To the presence of the peculiar adobe soil, the cleavable sandstone of the bluffs, and, to the climate, the ancient cliff and pueblo people are indebted for the material cause of their advancement. Mr. Morgan strenuously denies the knowledge of caustic lime mortar anywhere in aboriginal America; but admits that gypsum may have been used as a bond. While expressing his astonishment at the amount of skill exercised by a people so poorly furnished, the author does not fail to recognize the long and tedious miles intervening between their gradus and ours. At the close of the paper occurs this significant sentence, "That the original ancestors of the principal historic tribes of Mexico once inhabited the San Juan country is extremely probable, that the ancestors of the principal tribes of Yucatan and Central America owe their remote origin to the same region is equally probable.

And that the Mound Builders came originally from the same country is, with our present knowledge, at least a reasonable conclusion."

We may, without the least fear of exciting envy, give the first place of merit to the paper of Mr. Ad. F. Bandelier, on the "Social organization and government of the ancient Mexicans," occupying 142 pages of the report, and not falling below the author's communications on "The Art of War" and "The Tenure of Land" either in the importance of the subject or in the manner of treatment. All students of ancient Mexican sociology have felt the insecurity of Spanish chroniclers for two reasons. The most courtly and ceremonious people in the world could scarcely refrain from the use of such terms as "knight," "king," etc., when speaking of the Mexican rulers; and, secondly, every inducement existed to magnify the glory of their own deeds by exaggerating the numbers, valor, and culture of the Mexicans. This practice of embellishing, unfortunately has been perpetuated among modern writers of great genius. Mr. Bandelier, acknowledging what we have said above, and being profoundly impressed with the teachings of Mr. Morgan, has set himself the task of reconstructing the history of the ancient Mexican upon the systems of gentile organization contained in Morgan's "Ancient Society." The complicated nature of such a work necessarily determines the style of the communication; therefore, the great preponderance of notes over the text is partly justified. Long familiarity with ancient authorities and the coöperation of such distinguished Mexican scholars as Sr. Orozco y Berra and Sr. D. J. G. Icazbalceta, have specially fitted Mr. Bandelier for this difficult task. The special aim in the present member of the series is best told in the author's own words:

"There was, in aboriginal Mexico, neither state, nor nation, nor political society of any kind. We have found a population separated into tribes representing dialectical variations of speech, each tribe autonomous in matters of government, and occasionally forming confederacies for purposes of self-defence and conquest. Out of that confederacy, brought so prominently forward by the events of the Spanish conquest, we have selected on account of its military preëminence, one tribe—the ancient Mexicans—and we have shown that it was an organic body composed of twenty autonomous kins for purposes of mutual protection and subsistence. A social organization resting upon such a foundation must, of necessity, have been a democratic body. Indeed, we have found that each kin was governed by strictly elective officers, subject to removal at the pleasure of their constituents; that the twenty kins, for their mutual benefit had delegated their powers to transact business with outsiders to a council of the tribe, in which every kin was represented by one member, and consequently had the same voice and vote as any one of the others.

The execution of the decrees of this council was left to elective officers, whose power was limited to military command, and whom the tribe might depose at pleasure. With the exception of some inferior positions, these officers had not the power of appointing others to office, not even their assistants of high rank. The dignity of chief, so commonly transformed into hereditary nobility, has been found to have been merely a reward of merit, and carried with it no other prerogative than personal considerations and occasional indulgence in finery. Taking all our investigations we conclude *that the social organization and mode of government of the ancient Mexicans was a military democracy originally based upon communism in living.*"

THE AMERICAN ANTIQUARIAN.—The third number of Vol. II, contains the following papers, together with a large amount of interesting correspondence and editorial notes: The Mound Builders, by Stephen D. Peet; Brady's Leap, and other facts of Indian History, by J. P. Woodruff; Exploration of a Rock-Shelter in Summit Co., Ohio, by M. C. Read; Was LaSalle the Discoverer of the Mississippi river; Letter from Pierre Margry; The numeral adjectives in the Klamath Language of Southern Oregon, by Albert S. Gatschet; The Sign-Language of the Indians of the Upper Missouri, in 1832, by Colonel Garrick Mallery; Wampum Belts of the Six Nations, by Rev. W. M. Beauchamp. The first article is reproduced from the Proceedings of the "Congress of Americanists." Mr. Read's paper is a contribution to a little-worked portion of our anthropic area, but one that promises rich results. Pierre Margry holds that LaSalle discovered the Mississippi river, by way of the lakes, by Chicago, and the Illinois river, as far south as the 36th parallel, before 1676 (the date of Marquette's discovery). Mr. Gatschet's paper is an original communication of great merit, in which we find the numeral system of the Klamath Indians both laid down and explained. Col. Mallery gives us a segment of a great work which he is preparing under the auspices of Major Powell's Bureau of Ethnology, upon sign-language in general. Mr. Beauchamp is authority on wampum belts; and we have seen somewhere a set of drawings by this author giving the various designs represented on these belts.

ARCHÆOLOGY IN WISCONSIN.—Volume VIII of the Wisconsin Historical Collections, for the years 1877, 1878 and 1879, is a very important contribution to archæology. Before praising it too highly, we beg leave to caution the editors to read the proof of the next volume a little more closely, and to exclude the repetition of more than "thrice told tales," as on pages 148 and 149. The ancient copper-mines of Lake Superior are described by Mr. Jacob Houghton. On the south shore of Lake Superior the works of the ancient miners extend over a district of country comprising what is known as the Trap range, having a length of

150 miles through Keweenaw, Houghton, and Ontonagon counties, with a width varying from four to seven miles. They also wrought the copper deposits of the Trap range of Isle Royal, covering an area of about forty miles in length, by an average of five miles in width. The article by the Rev. Edmund F. Slafter, on prehistoric copper implements, treats the subject from an historical point of view. We drew attention to this paper on its first appearance in the *New England Historical and Genealogical Register*, for January, 1879. We are next treated to a *symposium* on copper-working—were the ancient copper-workers acquainted with the art of smelting copper? Mr. Draper opens the discussion, inclining slightly to the affirmative, and is followed by Mr. Fred. S. Perkins on the same side. The opposite view is advocated by Col. Charles Whittlesey and Doctor P. R. Hoy. It has occurred to us, as greenhorns, to ask some of our friends to try the effect of sound as a test. Make a mold of one of the implements supposed to have been cast. Take a cast copy, suspend it alongside of the original, by a wire, and strike them alternately with a rod of steel. A priori, if the original is cold hammered, it will be full of flakes and scales, and should give forth a duller sound than the cast copy. We are not strenuous advocates, however, of the “high priori” method. Indian pictography is now receiving a great deal of attention, and the Rev. Edward Brown has something to say about the Pictured Cave of La Crosse valley, near West Salem, Wis. On pages 188–194, Mr. Benjamin Sulté, of Ottawa, Canada, gives us a résumé of the labors of Jean Nicolet, in which the author affirms that “Nicolet must have traveled to the Mississippi, in the year 1634–5, from July to July, because that period is the only one during which we cannot find him on the shore of the St. Lawrence.” The papers on the Rev. Eleazer Williams, by Gen. A. G. Ellis and Mr. Lyman C. Draper, pp. 322–352, are certainly interesting reading upon a very great conundrum. In this connection we may say that the Rev. J. P. McLean, of Hamilton, Ohio, will commence in the July number of the *Universalist Quarterly*, a series of three articles upon the study of American archæology. Mr. McLean is one of our most diligent workers in the West, and will, doubtless, present the subject in its latest phases.

CLIFF-DWELLINGS IN SOUTHERN UTAH.—Mr. A. L. Siler has discovered at Malley's Nipple Ranch, near Pahreah, Kane county, Utah, remains of cliff-structures, which he describes as follows: The remains seem to have been the foundations of small huts built on ledges of red sandstone under overhanging cliffs. The walls were about six inches thick, made of thin, flat sandstone brought up from the valley below, and laid in adobe. The structures are divided into rooms about four feet square, leaving all the space between the building and the back of the cliff, usually about ten

feet, entirely free. Upon digging into one of the rooms, Mr. Siler found parched corn and rope in a good state of preservation.

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### GEOLOGY AND PALÆONTOLOGY.

ON THE OCCURRENCE OF FOOTPRINTS OF DINORNIS AT POVERTY BAY, NEW ZEALAND.—When in Auckland, New Zealand, in 1875, my attention was drawn to some specimens of "Moa" footprints then in the museum of the Auckland Institute. After examining them carefully, I determined to procure some of these rare specimens for myself; with this intention I made a visit to the locality, which is on the right bank of the Taruheru river, near Gisborne, Poverty bay. Here I found what I so much desired to see in place, where hundreds and perhaps thousands of years ago, these great birds, sauntering in search of food, left their footprints indelibly impressed on the sand.